

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Kipp *et al.*
Appl. No.: Not yet assigned
Filed: Concurrently Herewith
For: PLANT *MSH2* SEQUENCES AND METHODS OF USE


**STATEMENT IN SUPPORT OF FILING A
SEQUENCE LISTING UNDER 37 CFR § 1.821(f)**

Commissioner for Patents
Washington, DC 20231

Sir:

I hereby state that the content of the paper and computer readable copies of the Sequence Listing, submitted concurrently herewith in accordance with 37 CFR § 1.821(c) and (e), are the same.

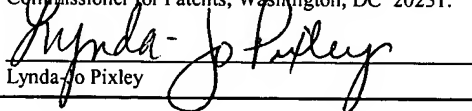
Respectfully submitted,


W. Murray Spruill
Attorney for Applicant
Registration No. 32,943

Alston & Bird LLP
Bank of America Plaza
101 South Tryon Street, Suite 4000
Charlotte, NC 28280-4000
Tel Raleigh Office (919) 420-2200
Fax Raleigh Office (919) 420-2260

"Express Mail" Mailing Label Number EL 868639990 US
Date of Deposit: December 20, 2001

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Box Patent Application, Commissioner for Patents, Washington, DC 20231.


Lynda Jo Pixley

0280
04/20

OIPE

4

RAW SEQUENCE LISTING

PATENT APPLICATION: US/10/029,065

DATE: 01/15/2002

TIME: 08:08:02

Input Set : A:\196219.txt

Output Set: N:\CRF3\01152002\J029065.raw

3 <110> APPLICANT: May, Gregory
4 Baszczynski, Christopher
5 Zhu, Tong
6 Kipp, Peter
7 Mahajan, Pramod
9 <120> TITLE OF INVENTION: PLANT MSH2 SEQUENCES AND METHODS OF USE
11 <130> FILE REFERENCE: 5839-2 (035839/196219)
C--> 13 <140> CURRENT APPLICATION NUMBER: US/10/029,065
C--> 13 <141> CURRENT FILING DATE: 2001-12-20
13 <160> NUMBER OF SEQ ID NOS: 42
15 <170> SOFTWARE: PatentIn version 3.0
17 <210> SEQ ID NO: 1
18 <211> LENGTH: 3033
19 <212> TYPE: DNA
20 <213> ORGANISM: Nicotiana tabacum
22 <220> FEATURE:
23 <221> NAME/KEY: CDS
24 <222> LOCATION: (22)..(2838)
26 <400> SEQUENCE: 1
27 ataaagggtta aagaaaaaaa a atg aat gaa aat ttg gag gaa cag agc aag 51
28 Met Asn Glu Asn Leu Glu Glu Gln Ser Lys
29 1 5 10
31 ctt ccc gag ctt aaa ctg gat gct aag caa gct caa gga ttt ctc tca 99
32 Leu Pro Glu Leu Lys Leu Asp Ala Lys Gln Ala Gln Gly Phe Leu Ser
33 15 20 25
35 ttc ttc aaa acc ctg ccc aag gac cct agg gca gtt cgc ctc ttt gat 147
36 Phe Phe Lys Thr Leu Pro Lys Asp Pro Arg Ala Val Arg Leu Phe Asp
37 30 35 40
39 cgt cgg gac tat tat aca tct cat gga gat gat gca act ttc att gca 195
40 Arg Arg Asp Tyr Tyr Thr Ser His Gly Asp Asp Ala Thr Phe Ile Ala
41 45 50 55
43 gag aca tat tac cac aca aca act gcg tta cga cag ttg ggt aat aga 243
44 Glu Thr Tyr Tyr His Thr Thr Thr Ala Leu Arg Gln Leu Gly Asn Arg
45 60 65 70
47 gct gat gcc ctt tcc agt gtt agt gtg agt aga aac atg ttt gaa aca 291
48 Ala Asp Ala Leu Ser Ser Val Ser Val Ser Arg Asn Met Phe Glu Thr
49 75 80 85 90
51 ata gct cgt gac att ctc ttg gag aga atg gac cgt act ctt gaa cta 339
52 Ile Ala Arg Asp Ile Leu Leu Glu Arg Met Asp Arg Thr Leu Glu Leu
53 95 100 105
55 tat gag ggc agt ggt tca aac tgg aga ctg gta aaa agt gga acc cca 387
56 Tyr Glu Gly Ser Gly Ser Asn Trp Arg Leu Val Lys Ser Gly Thr Pro
57 110 115 120
59 ggg aat ctt gga agt ttt gag gat att ctg ttt gct aat aat gaa atg 435
60 Gly Asn Leu Gly Ser Phe Glu Asp Ile Leu Phe Ala Asn Asn Glu Met
61 125 130 135
63 caa aat tct ccg gtg att gct gct ctt gct cca aac ttc ggt cag aat 483

ENTERED

RAW SEQUENCE LISTING

PATENT APPLICATION: US/10/029,065

DATE: 01/15/2002

TIME: 08:08:02

Input Set : A:\196219.txt

Output Set: N:\CRF3\01152002\J029065.raw

64	Gln	Asn	Ser	Pro	Val	Ile	Ala	Ala	Leu	Ala	Pro	Asn	Phe	Gly	Gln	Asn	
65		140					145				150						
67	gga	tgt	gaa	gtt	ggc	tta	ggc	tat	gtt	gat	att	act	aag	aga	gtc	ctt	531
68	Gly	Cys	Glu	Val	Gly	Leu	Gly	Tyr	Val	Asp	Ile	Thr	Lys	Arg	Val	Leu	
69	155					160				165					170		
71	ggt	tta	aca	gaa	ttt	cta	gat	gat	agc	cac	ttc	aca	aat	ttg	gag	tct	579
72	Gly	Leu	Thr	Glu	Phe	Leu	Asp	Asp	Ser	His	Phe	Thr	Asn	Leu	Glu	Ser	
73					175					180					185		
75	gct	ttg	gtt	gct	ctt	ggt	tgc	aga	gaa	tgt	ctt	gta	cca	gcg	gag	act	627
76	Ala	Leu	Val	Ala	Leu	Gly	Cys	Arg	Glu	Cys	Leu	Val	Pro	Ala	Glu	Thr	
77			190						195			200					
79	ggc	aaa	tcc	agt	gaa	tac	agg	cct	atg	ttt	gat	gca	ata	tct	aga	tgc	675
80	Gly	Lys	Ser	Ser	Glu	Tyr	Arg	Pro	Met	Phe	Asp	Ala	Ile	Ser	Arg	Cys	
81		205					210				215						
83	ggc	gtg	atg	gta	act	gaa	aga	aag	aaa	act	gaa	ttt	aaa	ggg	aga	gat	723
84	Gly	Val	Met	Val	Thr	Glu	Arg	Lys	Lys	Thr	Glu	Phe	Lys	Gly	Arg	Asp	
85		220					225				230						
87	ttg	gta	cag	gat	ctt	ggt	agg	ctc	gtc	aag	ggt	tca	gta	gaa	cct	gtt	771
88	Leu	Val	Gln	Asp	Leu	Gly	Arg	Leu	Val	Lys	Gly	Ser	Val	Glu	Pro	Val	
89	235				240				245						250		
91	cga	gat	ttg	gtc	tct	ggg	ttc	gaa	tgt	gca	tca	ggc	gct	ttg	ggg	tgc	819
92	Arg	Asp	Leu	Val	Ser	Gly	Phe	Glu	Cys	Ala	Ser	Gly	Ala	Leu	Gly	Cys	
93			255					260						265			
95	ata	ctt	tct	tat	gca	gaa	cta	ctt	gcg	gat	gag	agc	aac	tat	gga	aac	867
96	Ile	Leu	Ser	Tyr	Ala	Glu	Leu	Leu	Ala	Asp	Glu	Ser	Asn	Tyr	Gly	Asn	
97			270					275					280				
99	tat	aca	gtc	aaa	caa	tac	aac	ctc	aat	agt	tac	atg	aga	tta	gat	tct	915
100	Tyr	Thr	Val	Lys	Gln	Tyr	Asn	Leu	Asn	Ser	Tyr	Met	Arg	Leu	Asp	Ser	
101			285					290					295				
103	gct	gct	atg	aga	gca	ctg	aat	gtt	atg	gag	agc	aaa	tca	gat	gct	aat	963
104	Ala	Ala	Met	Arg	Ala	Leu	Asn	Val	Met	Glu	Ser	Lys	Ser	Asp	Ala	Asn	
105		300					305				310						
107	aaa	aat	ttt	agc	ttg	ttc	ggt	ctg	atg	aat	aga	acg	tgt	act	gct	gga	1011
108	Lys	Asn	Phe	Ser	Leu	Phe	Gly	Leu	Met	Asn	Arg	Thr	Cys	Thr	Ala	Gly	
109	315				320				325						330		
111	atg	ggt	aaa	agg	tta	ttg	cac	atg	tgg	ctg	aag	caa	cct	tta	cta	gat	1059
112	Met	Gly	Lys	Arg	Leu	Leu	His	Met	Trp	Leu	Lys	Gln	Pro	Leu	Leu	Asp	
113			335					340					345				
115	gta	gaa	gag	att	aac	tgt	agg	ctg	gat	tta	gtt	caa	tca	ttc	gtg	gag	1107
116	Val	Glu	Glu	Ile	Asn	Cys	Arg	Leu	Asp	Leu	Val	Gln	Ser	Phe	Val	Glu	
117			350					355					360				
119	gat	gct	gcg	ctt	cgc	caa	gat	ttg	agg	cag	cat	ctg	aaa	aga	att	tca	1155
120	Asp	Ala	Ala	Leu	Arg	Gln	Asp	Leu	Arg	Gln	His	Leu	Lys	Arg	Ile	Ser	
121		365					370					375					
123	gat	att	gag	cgg	ctg	aca	cac	aat	ctt	gag	agg	aaa	aga	gcc	agt	tta	1203
124	Asp	Ile	Glu	Arg	Leu	Thr	His	Asn	Leu	Glu	Arg	Lys	Arg	Ala	Ser	Leu	
125		380					385					390					
127	gtg	cac	gtt	gta	aaa	ctc	tat	cag	tca	agt	acc	aga	gta	cca	tat	atc	1251
128	Val	His	Val	Val	Lys	Leu	Tyr	Gln	Ser	Ser	Thr	Arg	Val	Pro	Tyr	Ile	

RAW SEQUENCE LISTING

PATENT APPLICATION: US/10/029,065

DATE: 01/15/2002

TIME: 08:08:02

Input Set : A:\196219.txt

Output Set: N:\CRF3\01152002\J029065.raw

129	395		400		405		410	
131	aaa	agt	gtt	ttg	gaa	cgt	cat	gat
132	Lys	Ser	Val	Leu	Glu	Arg	His	Asp
133					415			420
135	gaa	agg	tat	att	gat	tct	cta	gag
136	Glu	Arg	Tyr	Ile	Asp	Ser	Leu	Glu
137					430			435
139	aat	aag	ttc	ata	ggt	ctt	gtg	gaa
140	Asn	Lys	Phe	Ile	Gly	Leu	Val	Glu
141					445			450
143	gag	aat	gga	gaa	tac	atg	att	tct
144	Glu	Asn	Gly	Glu	Tyr	Met	Ile	Ser
145					460			465
147	gct	ctg	aag	gat	gag	caa	gag	aca
148	Ala	Leu	Lys	Asp	Glu	Gln	Glu	Thr
149	475				480			485
151	cac	aaa	caa	act	gcc	aat	gat	ctt
152	His	Lys	Gln	Thr	Ala	Asn	Asp	Leu
153					495			500
155	aaa	cta	gat	aaa	gaa	aca	caa	ttt
156	Lys	Leu	Asp	Lys	Glu	Thr	Gln	Phe
157					510			515
159	aaa	gaa	gaa	cca	aaa	gtc	agg	aag
160	Lys	Glu	Glu	Pro	Lys	Val	Arg	Lys
161					525			530
163	ctc	gaa	aca	cgt	aag	gat	ggg	gta
164	Leu	Glu	Thr	Arg	Lys	Asp	Gly	Val
165					540			545
167	aaa	cta	gga	gat	cag	ttc	cag	aag
168	Lys	Leu	Gly	Asp	Gln	Phe	Gln	Lys
169	555				560			565
171	cag	aaa	gaa	ttg	gta	gct	cgt	gta
172	Gln	Lys	Glu	Leu	Val	Ala	Arg	Val
173					575			580
175	gag	gtg	ttt	gca	ggt	ata	gct	ggt
176	Glu	Val	Phe	Ala	Gly	Ile	Ala	Gly
177					590			595
179	ctg	agt	ttt	gcg	gat	ttg	gct	gcc
180	Leu	Ser	Phe	Ala	Asp	Leu	Ala	Ala
181					605			610
183	cca	aat	atc	agt	cca	cca	gat	aca
184	Pro	Asn	Ile	Ser	Pro	Pro	Asp	Thr
185					620			625
187	agg	cat	cct	tgt	gtg	gaa	gct	caa
188	Arg	His	Pro	Cys	Val	Glu	Ala	Gln
189	635				640			645
191	gac	tgt	aga	cta	gtt	agg	gga	gag
192	Asp	Cys	Arg	Leu	Val	Arg	Gly	Glu
193					655			660

RAW SEQUENCE LISTING

PATENT APPLICATION: US/10/029,065

DATE: 01/15/2002

TIME: 08:08:02

Input Set : A:\196219.txt

Output Set: N:\CRF3\01152002\J029065.raw

195	cct	aac	atg	ggt	gga	aag	tcg	acc	tac	att	cgg	cag	gtt	ggt	gtg	aat	2067
196	Pro	Asn	Met	Gly	Gly	Lys	Ser	Thr	Tyr	Ile	Arg	Gln	Val	Gly	Val	Asn	
197				670					675					680			
199	gtc	ctg	atg	gcc	caa	gtt	ggc	tcg	ttt	gtt	cca	tgt	gac	aat	gct	acc	2115
200	Val	Leu	Met	Ala	Gln	Val	Gly	Ser	Phe	Val	Pro	Cys	Asp	Asn	Ala	Thr	
201				685					690					695			
203	att	tct	att	cgt	gat	tgt	att	ttt	gct	cgt	gtt	ggc	gct	gga	gat	tgc	2163
204	Ile	Ser	Ile	Arg	Asp	Cys	Ile	Phe	Ala	Arg	Val	Gly	Ala	Gly	Asp	Cys	
205			700					705						710			
207	cag	ctg	aga	gga	gtt	tct	act	ttt	atg	caa	gag	atg	ctt	gag	act	gca	2211
208	Gln	Leu	Arg	Gly	Val	Ser	Thr	Phe	Met	Gln	Glu	Met	Leu	Glu	Thr	Ala	
209	715					720						725				730	
211	tcg	atc	ttg	aaa	gga	gct	act	gat	aga	tca	ttg	att	ata	att	gat	gag	2259
212	Ser	Ile	Leu	Lys	Gly	Ala	Thr	Asp	Arg	Ser	Leu	Ile	Ile	Ile	Asp	Glu	
213					735					740						745	
215	ttg	ggc	cgt	ggg	aca	tca	acc	tac	gat	ggc	ttt	ggt	tta	gct	tgg	gct	2307
216	Leu	Gly	Arg	Gly	Thr	Ser	Thr	Tyr	Asp	Gly	Phe	Gly	Leu	Ala	Trp	Ala	
217				750						755					760		
219	att	tgt	gag	cac	att	gtt	gaa	gaa	att	aaa	gca	cca	aca	ttg	ttt	gcc	2355
220	Ile	Cys	Glu	His	Ile	Val	Glu	Glu	Ile	Lys	Ala	Pro	Thr	Leu	Phe	Ala	
221				765					770						775		
223	act	cac	ttt	cat	gag	ctg	act	gca	tta	gcc	aac	aag	aat	gga	gac	aat	2403
224	Thr	His	Phe	His	Glu	Leu	Thr	Ala	Leu	Ala	Asn	Lys	Asn	Gly	Asp	Asn	
225			780						785					790			
227	gga	cat	aag	aaa	aat	gct	ggg	ata	gca	aat	ttt	cat	gtt	ttt	gca	cac	2451
228	Gly	His	Lys	Lys	Asn	Ala	Gly	Ile	Ala	Asn	Phe	His	Val	Phe	Ala	His	
229	795					800					805					810	
231	att	gac	cct	tct	aat	cgc	aag	cta	act	atg	ctt	tac	aag	gtt	cac	cca	2499
232	Ile	Asp	Pro	Ser	Asn	Arg	Lys	Leu	Thr	Met	Leu	Tyr	Lys	Val	His	Pro	
233					815					820					825		
235	ggt	gct	tgt	gat	cag	agt	ttt	ggt	att	cat	gtt	gct	gaa	ttt	gca	aat	2547
236	Gly	Ala	Cys	Asp	Gln	Ser	Phe	Gly	Ile	His	Val	Ala	Glu	Phe	Ala	Asn	
237				830						835					840		
239	ttt	cca	ccg	agt	gtt	gtg	gct	ctg	gct	aga	gaa	aag	gca	tct	gag	ttg	2595
240	Phe	Pro	Pro	Ser	Val	Val	Ala	Leu	Ala	Arg	Glu	Lys	Ala	Ser	Glu	Leu	
241				845					850						855		
243	gag	gat	ttc	tct	cct	att	gcc	ata	att	cca	aat	gac	att	aaa	gag	gca	2643
244	Glu	Asp	Phe	Ser	Pro	Ile	Ala	Ile	Ile	Pro	Asn	Asp	Ile	Lys	Glu	Ala	
245			860						865					870			
247	gct	tca	aaa	cgg	aag	aga	gaa	ttt	gac	cgc	cat	gac	gtg	tct	aga	ggt	2691
248	Ala	Ser	Lys	Arg	Lys	Arg	Glu	Phe	Asp	Arg	His	Asp	Val	Ser	Arg	Gly	
249	875					880					885					890	
251	act	gcc	aga	gct	cgg	caa	ttc	tta	cag	gat	ttc	gct	cag	ttg	cca	ctg	2739
252	Thr	Ala	Arg	Ala	Arg	Gln	Phe	Leu	Gln	Asp	Phe	Ala	Gln	Leu	Pro	Leu	
253					895					900						905	
255	gat	aag	atg	gat	cca	aac	gtg	gtc	agg	caa	aag	ttg	agc	aaa	atg	aaa	2787
256	Asp	Lys	Met	Asp	Pro	Asn	Val	Val	Arg	Gln	Lys	Leu	Ser	Lys	Met	Lys	
257				910						915						920	
259	acc	gac	ctg	gag	agg	gat	gca	gtt	gac	tct	cac	tgg	ctt	cag	caa	ttc	2835

RAW SEQUENCE LISTING

DATE: 01/15/2002

PATENT APPLICATION: US/10/029,065

TIME: 08:08:02

Input Set : A:\196219.txt

Output Set: N:\CRF3\01152002\J029065.raw

```

260 Thr Asp Leu Glu Arg Asp Ala Val Asp Ser His Trp Leu Gln Gln Phe
261          925                      930                      935
263 ttt taattcttca gattagaact atcttctatt ctgtgaagct tgggggggaa      2888
264 Phe
267 tgatacttat gggttttgtg gatataactt agcctatctg taaactttca tttaaatcct      2948
269 taccaccaaac atgattctct gtaatcaggg gacttttgta tgcattctgt gttaatagta      3008
271 agcgttatct tatatgggtca aaaaaa      3033
274 <210> SEQ ID NO: 2
275 <211> LENGTH: 939
276 <212> TYPE: PRT
277 <213> ORGANISM: Nicotiana tabacum
279 <400> SEQUENCE: 2
281 Met Asn Glu Asn Leu Glu Glu Gln Ser Lys Leu Pro Glu Leu Lys Leu
282 1          5                      10                      15
285 Asp Ala Lys Gln Ala Gln Gly Phe Leu Ser Phe Phe Lys Thr Leu Pro
286          20                      25                      30
289 Lys Asp Pro Arg Ala Val Arg Leu Phe Asp Arg Arg Asp Tyr Tyr Thr
290          35                      40                      45
293 Ser His Gly Asp Asp Ala Thr Phe Ile Ala Glu Thr Tyr Tyr His Thr
294          50                      55                      60
297 Thr Thr Ala Leu Arg Gln Leu Gly Asn Arg Ala Asp Ala Leu Ser Ser
298 65          70                      75                      80
301 Val Ser Val Ser Arg Asn Met Phe Glu Thr Ile Ala Arg Asp Ile Leu
302          85                      90                      95
305 Leu Glu Arg Met Asp Arg Thr Leu Glu Leu Tyr Glu Gly Ser Gly Ser
306          100                     105                     110
309 Asn Trp Arg Leu Val Lys Ser Gly Thr Pro Gly Asn Leu Gly Ser Phe
310          115                     120                     125
313 Glu Asp Ile Leu Phe Ala Asn Asn Glu Met Gln Asn Ser Pro Val Ile
314          130                     135                     140
317 Ala Ala Leu Ala Pro Asn Phe Gly Gln Asn Gly Cys Glu Val Gly Leu
318 145          150                     155                     160
321 Gly Tyr Val Asp Ile Thr Lys Arg Val Leu Gly Leu Thr Glu Phe Leu
322          165                     170                     175
325 Asp Asp Ser His Phe Thr Asn Leu Glu Ser Ala Leu Val Ala Leu Gly
326          180                     185                     190
329 Cys Arg Glu Cys Leu Val Pro Ala Glu Thr Gly Lys Ser Ser Glu Tyr
330          195                     200                     205
333 Arg Pro Met Phe Asp Ala Ile Ser Arg Cys Gly Val Met Val Thr Glu
334          210                     215                     220
337 Arg Lys Lys Thr Glu Phe Lys Gly Arg Asp Leu Val Gln Asp Leu Gly
338 225          230                     235                     240
341 Arg Leu Val Lys Gly Ser Val Glu Pro Val Arg Asp Leu Val Ser Gly
342          245                     250                     255
345 Phe Glu Cys Ala Ser Gly Ala Leu Gly Cys Ile Leu Ser Tyr Ala Glu
346          260                     265                     270
349 Leu Leu Ala Asp Glu Ser Asn Tyr Gly Asn Tyr Thr Val Lys Gln Tyr
350          275                     280                     285
353 Asn Leu Asn Ser Tyr Met Arg Leu Asp Ser Ala Ala Met Arg Ala Leu

```

Use of n and/or Xaa has been detected in the Sequence Listing.
 Review the Sequence Listing to insure a corresponding
 explanation is presented in the <220> to <223> fields of
 each sequence using n or Xaa.

VERIFICATION SUMMARY

PATENT APPLICATION: US/10/029,065

DATE: 01/15/2002

TIME: 08:08:03

Input Set : A:\196219.txt

Output Set: N:\CRF3\01152002\J029065.raw

L:13 M:270 C: Current Application Number differs, Replaced Current Application No

L:13 M:271 C: Current Filing Date differs, Replaced Current Filing Date

L:1029 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5

L:1054 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6

L:1058 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6

L:1073 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:7

L:1098 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:8

L:1102 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:8

L:1121 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:9

L:1136 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:10

L:1161 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:11

L:1165 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:11

L:1180 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:12

L:1205 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:13

L:1329 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:21

L:1423 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:29

L:1444 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:30